Table 4-3. m-factors for Steel Components

Component/Conditions	Primary		Secondary	
	LS	IO	LS	IO
Fully restrained moment frames				
Beams				
$\frac{b}{2t_f} < \frac{52}{\sqrt{F_{ye}}}$	8	3	13	3
$\frac{b}{2t_f} > \frac{95}{\sqrt{F_{ye}}}$	3	2	4	2
Columns ($P<0.2P_y$)				
$\frac{b}{2t_f} < \frac{52}{\sqrt{F_{ye}}}$	8	3	13	3
$\frac{b}{2t_f} > \frac{95}{\sqrt{F_{ye}}}$	2	2	3	2
Columns ($0.2P_y < P < 0.5P_y$)				
$\frac{b}{2t_f} < \frac{52}{\sqrt{F_{ye}}}$	(1)	2	(2)	2
$\frac{b}{2t_f} > \frac{95}{\sqrt{F_{ye}}}$	2	2	3	2
Panel Zones	10	3	14	3
Welded Moment Connections (5)	2	1	2	1
Partially restrained moment connections				
Bolts or Welds in Tension	2.5	1.5	3.5	1.5
Other	4	2	6	2
Braced Frames				
Columns (3)				
Eccentric Braced Frames				
Link Beam				
Brace and Column (3)	Same as beams in fully restrained frames.			
Braces in Compression				
Tubes: $\frac{d}{t} \le \frac{90}{\sqrt{F_{ye}}}$; Pipes: $\frac{d}{t} \le \frac{1500}{\sqrt{F_{ye}}}$	6	2.5	9	2.5
Tubes: $\frac{d}{t} \le \frac{190}{\sqrt{F_{ye}}}$; Pipes: $\frac{d}{t} \le \frac{6000}{\sqrt{F_{ye}}}$	3	1.5	3	1.5
Other shapes	6	2.5	9	2.5
Braces in Tension				
Tension-compression brace	6	2.5	11	3
Tension-only brace	3	1.5	11	3
Metal Deck	4	2	--	--

$F_{ye} = 1.25F_y$, Expected yield stress;
(1) $m=12(1.7P/P_y)$;
(2) $m=20(1.7P/P_y)$;
(3) Force-controlled;
(4) Axial load due to gravity and earthquake calculated as force-controlled action per Section 4.2.4.3.2.
(5) Alternatively, these connections may be considered force-controlled if connections and joint web shear can be shown to develop the capacity of the beam.

Table 4-4. m-factors for Concrete Components

Component/Conditions	Primary		Secondary	
	LS	IO	LS	IO
Beams, flexure				
Ductile[1]				
$v \leq 3\sqrt{f'_c}$	8	3	8	3
$v \geq 6\sqrt{f'_c}$	4	2.5	4	2.5
Non-Ductile	2.5	1.5	3	1.5
Columns, flexure				
Ductile[1]				
$\frac{P}{A_g f'_c} \leq 0.1$	5	3	5	3
$\frac{P}{A_g f'_c} \geq 0.4$	2	1.5	2	1.5
Non-Ductile	2.5	1.5	3	2
$\frac{P}{A_a f'_c} \leq 0.1$	1.5	1.5	1.5	1.5
$\frac{P}{A_a f'_c} \geq 0.4$				
Beams controlled by shear	2	1.5	3.5	2.5
Beam-Column Joints	(2)	(2)	(2)	(2)
Slab-Column Systems[5]				
$\frac{V_s}{V_c} \leq 0.1$	3	3	3	3
$\frac{V_s}{V_c} \geq 0.4$	1.5	1.5	1.5	1.5
Infilled Frame Columns Modeled as Chords				
Confined along entire length	4	1.5	5	1.5
Not confined	1.5	1.5	1.5	1.5
Shear Walls Controlled by Flexure				
With confined boundary				
$a \leq 0.1$[3]	5	3	6	3
$a \geq 0.25$	3	1.5	4	1.5
Without confined boundary				
$a \leq 0.1$	3	2	4	2
$a \geq 0.25$	2	1.5	2.5	1.5
Coupling Beams	2.5	1.5	4	2
Shear Walls Controlled by Shear	2.5	1.5	3	2

(1)Ductile beams and columns shall conform to the following requirements: (a) Within the plastic region, closed stirrups shall be spaced at < d/3, (b) Strength provided by stirrups shall be at least 3/4 of the design shear, (c) Longitudinal reinforcement shall not be lapped within the plastic hinge region, (d) $(\rho-\rho')/\rho_{bal} < 0.5$, (e) Column flexural capacity exceeds beam flexural capacity.

(2)These joints shall be considered force-controlled.

(3)$a=[(A_s-A_s')f_y + P]/A_w f_c'$.

(4)P=Axial load due to gravity and earthquake calculated as a force-controlled action per Section 4.2.4.3.2.

(5)V_g=gravity shear; V_o=punching shear capacity.

Table 4-5. m-factors for Masonry Components

Component/Conditions	Primary		Secondary	
	LS	IO	LS	IO
Unreinforced Masonry(1)	1.5	1	3	1
Reinforced Masonry in Flexure (2)				
$f_a \leq 0.04 f'm$				
$\rho f_y / f'_c = 0.01$(3)	6	3	8	3
$\rho f_y / f'_c = 0.05$	4.5	2.5	7	2.5
$\rho f_y / f'_c = 0.20$	2.5	1.5	4	1.5
$f_a \leq 0.075 f'm$				
$\rho f_y / f'_c = 0.01$	4	2.5	7	2.5
$\rho f_y / f'_c = 0.05$	3	2	6	2
$\rho f_y / f'_c = 0.20$	2.5	1.5	4	1.5
Reinforced Masonry in Shear	2.5	1	4	1.5
Masonry Infill(4)	3	1	--	--

(1) Applicable to building with rigid diaphragms; for flexible diaphragms see Special Procedure.

(2) f_a = axial stress due to gravity loads per Equation (4-11).

(3) ρ = percentage of total vertical reinforcement including boundary elements, if any.

(4) Capacity based on bed joint shear strength for zero vertical compressive stress.

Table 4-6. m-factors for Wood Components

Component/Conditions	Primary		Secondary	
	LS	IO	LS	IO
Straight Sheathing, Diagonal Sheathing, and Double Diagonal Sheathing[1]	3	1.5	4	1.5
Gypsum Sheathing/Wallboard[1]	4	2	5	2
Plywood Sheathing				
Shear Walls				
$h/L \leq 1.0$	4.5	2	5.5	2
$3.5 \geq h/L \geq 2.0$[2]	3.5	1.7	4.5	1.7
Diaphragms	3.5	2	4	2
Hold-down anchors	3.5	2	No limit	No limit

[1]For h/L $\geq$ 2.0, the component shall not be considered effective as a primary component.

[2]For h/L $\geq$ 3.5, the component shall not be considered effective as a primary component.

Table 4-7. Nonstructural Component Amplfication and Response Modification Factors

Component		**a_p [1]**	**R_p [2]**
A. ARCHITECTURAL			
1.	**Exterior Skin**		
	Adhered Veneer	1	4
	Anchored Veneer	1	3[3]
	Glass Block	1	2
	Prefabricated Panels	1	3[3]
	Glazing Systems	1	2
2.	**Partitions**		
	Heavy	1	1.5
	Light	1	3
3.	**Interior Veneers**		
	Stone, Including Marble	1	1.5
	Ceramic Tile	1	1.5
4.	**Ceilings**		
	Directly Applied to Sructure	1	1.5
	Dropped, Furred Gypsum Board	1	1.5
	Suspended Lath and Plaster	1	1.5
	Suspended Integrated Ceiling	1	1.5
5.	**Parapets, Cornices,Ornamentation and Appendages**	2.5	1.25
6.	**Canopies and Marquees**	2.5	1.5
7.	**Chimneys and Stacks**	2.5	1.25
8.	**Stairs**	1	3
B. MECHANICAL EQUIPMENT			
1.	**Mechanical Equipment**		
	Boilers and Furnaces	1	3
	General Mfg. and Process Machinery	1	3
	HVAC Equipment, Vibration Isolated	2.5	3
	HVAC Equipment, Nonvibration Isolated	1	3
	HVAC Equipment, mounted in-line	1	3
2.	**Storage Vessels and Water-heaters**		
	Vessels on Legs	2.5	1.5
	Flat Bottom Vessels	2.5	3
3.	**High-Pressure Piping**	2.5	4
4.	**Fire-Suppression Piping**	2.5	4
5.	**Fluid piping, not Fire Suppression**		
	Hazardous Materials	2.5	1
	Nonhazardous Materials	2.5	4
6.	**Ductwork**	1	3

Table 4-7. Nonstructural Component Amplfication and Response Modification Factors (cont'd.)

Component		**a_p** [1]	**R_p** [2]
C. ELECTRICAL AND COMMUNICATIONS EQUIPMENT			
1.	**Electrical and Communications Equipment**	1	3
2.	**Electrical and Communications Distribution Equipment**	2.5	5
3.	**Light Fixtures**		
	Recessed	1	1.5
	Surface Mounted	1	1.5
	Integrated Ceiling	1	1.5
	Pendant	1	1.5
D. FURNISHINGS AND INTERIOR EQUIPMENT			
1.	**Storage Racks**	2.5	4
2.	**Bookcases**	1	3
3.	**Computer Access Floors**	1	3
4.	**Hazardous Materials Storage**	2.5	1
5.	**Computer and Communications Racks**	2.5	6
6.	**Elevators**	1	3
7	**Conveyors**	2.5	3

(1) A lower value for a_p may be justified by detailed dynamic analysis. The value for a_p is for equipment generally regarded as rigid and rigidly attached. The value of a_p=2.5 is for equipment generally regarded as flexible and flexibly mounted. Refer to the definitions for explanations of "Component, Flexible" and "Component, Rigid." Where flexible diaphragms provide lateral support for walls and partitions, the value of a_p shall be increased to 2.0 for the center one-half of the span.

(2) R_p=1.5 for anchorage design when component anchorage is provided by expansion bolts, shallow chemical anchors, or shallow (nonductile) cast-in-place anchors or when the component is constructed of nonductile materials. Shallow anchors are those with an embedment length-to-bolt diameter ratio of less than 8.

(3) Applies when attachment is ductile materal and design, otherwise R_p=1.5.